# Diversity

begin training using triangular learning rate policy with max lr of 2e-05...

Epoch 1/20

89/89 [==============================] - 40s 202ms/step - loss: 0.5628 - accuracy: 0.6851 - val\_loss: 0.3569 - val\_accuracy: 0.8571

Epoch 2/20

89/89 [==============================] - 13s 151ms/step - loss: 0.3232 - accuracy: 0.8604 - val\_loss: 0.2897 - val\_accuracy: 0.8824

Epoch 3/20

89/89 [==============================] - 14s 152ms/step - loss: 0.2439 - accuracy: 0.9072 - val\_loss: 0.2630 - val\_accuracy: 0.8824

Epoch 4/20

89/89 [==============================] - 14s 154ms/step - loss: 0.1917 - accuracy: 0.9297 - val\_loss: 0.2462 - val\_accuracy: 0.9076

Epoch 5/20

89/89 [==============================] - 13s 151ms/step - loss: 0.1690 - accuracy: 0.9335 - val\_loss: 0.2574 - val\_accuracy: 0.8992

Epoch 6/20

89/89 [==============================] - ETA: 0s - loss: 0.1274 - accuracy: 0.9438

Epoch 00006: Reducing Max LR on Plateau: new max lr will be 1e-05 (if not early\_stopping).

89/89 [==============================] - 14s 152ms/step - loss: 0.1274 - accuracy: 0.9438 - val\_loss: 0.2827 - val\_accuracy: 0.9160

Epoch 7/20

89/89 [==============================] - ETA: 0s - loss: 0.1087 - accuracy: 0.9550Restoring model weights from the end of the best epoch: 4.

89/89 [==============================] - 14s 156ms/step - loss: 0.1087 - accuracy: 0.9550 - val\_loss: 0.3847 - val\_accuracy: 0.8908

Epoch 7: early stopping

Weights from best epoch have been loaded into model.

<keras.callbacks.History at 0x7f49e0539890>

Table

Description automatically generated

# Moral

begin training using triangular learning rate policy with max lr of 2e-05...

Epoch 1/40

21/21 [==============================] - 34s 565ms/step - loss: 0.7081 - accuracy: 0.5537 - val\_loss: 0.5876 - val\_accuracy: 0.7407

Epoch 2/40

21/21 [==============================] - 7s 346ms/step - loss: 0.6281 - accuracy: 0.6488 - val\_loss: 0.5200 - val\_accuracy: 0.8148

Epoch 3/40

21/21 [==============================] - 7s 353ms/step - loss: 0.5552 - accuracy: 0.7273 - val\_loss: 0.4726 - val\_accuracy: 0.8148

Epoch 4/40

21/21 [==============================] - 7s 336ms/step - loss: 0.4940 - accuracy: 0.7438 - val\_loss: 0.6447 - val\_accuracy: 0.7407

Epoch 5/40

21/21 [==============================] - 7s 339ms/step - loss: 0.4339 - accuracy: 0.7975 - val\_loss: 0.5051 - val\_accuracy: 0.7037

Epoch 6/40

21/21 [==============================] - 7s 341ms/step - loss: 0.3798 - accuracy: 0.8430 - val\_loss: 0.5224 - val\_accuracy: 0.8148

Epoch 7/40

21/21 [==============================] - 7s 345ms/step - loss: 0.3498 - accuracy: 0.8595 - val\_loss: 0.6898 - val\_accuracy: 0.6667

Epoch 8/40

21/21 [==============================] - ETA: 0s - loss: 0.3452 - accuracy: 0.8471

Epoch 00008: Reducing Max LR on Plateau: new max lr will be 1e-05 (if not early\_stopping).

21/21 [==============================] - 7s 347ms/step - loss: 0.3452 - accuracy: 0.8471 - val\_loss: 0.7921 - val\_accuracy: 0.6667

Epoch 9/40

21/21 [==============================] - 7s 350ms/step - loss: 0.2766 - accuracy: 0.8843 - val\_loss: 0.5977 - val\_accuracy: 0.7407

Epoch 10/40

21/21 [==============================] - 7s 353ms/step - loss: 0.2294 - accuracy: 0.9008 - val\_loss: 0.6627 - val\_accuracy: 0.7037

Epoch 11/40

21/21 [==============================] - 7s 356ms/step - loss: 0.2225 - accuracy: 0.9132 - val\_loss: 0.7182 - val\_accuracy: 0.7037

Epoch 12/40

21/21 [==============================] - 8s 359ms/step - loss: 0.2358 - accuracy: 0.8967 - val\_loss: 0.6220 - val\_accuracy: 0.7778

Epoch 13/40

21/21 [==============================] - ETA: 0s - loss: 0.2109 - accuracy: 0.9008

Epoch 00013: Reducing Max LR on Plateau: new max lr will be 5e-06 (if not early\_stopping).

Restoring model weights from the end of the best epoch: 3.

21/21 [==============================] - 8s 370ms/step - loss: 0.2109 - accuracy: 0.9008 - val\_loss: 0.7453 - val\_accuracy: 0.7037

Epoch 13: early stopping

Weights from best epoch have been loaded into model.

<keras.callbacks.History at 0x7fe9152c8e90>

Table

Description automatically generated

# Market

begin training using triangular learning rate policy with max lr of 2e-05...

Epoch 1/40

14/14 [==============================] - 31s 687ms/step - loss: 0.6488 - accuracy: 0.6173 - val\_loss: 0.5508 - val\_accuracy: 0.8333

Epoch 2/40

14/14 [==============================] - 5s 380ms/step - loss: 0.4592 - accuracy: 0.8519 - val\_loss: 0.4737 - val\_accuracy: 0.7778

Epoch 3/40

14/14 [==============================] - 5s 361ms/step - loss: 0.3119 - accuracy: 0.9074 - val\_loss: 0.4624 - val\_accuracy: 0.8333

Epoch 4/40

14/14 [==============================] - 5s 361ms/step - loss: 0.2069 - accuracy: 0.9259 - val\_loss: 0.4622 - val\_accuracy: 0.6667

Epoch 5/40

14/14 [==============================] - 5s 341ms/step - loss: 0.1300 - accuracy: 0.9630 - val\_loss: 0.5181 - val\_accuracy: 0.7778

Epoch 6/40

14/14 [==============================] - 5s 343ms/step - loss: 0.0867 - accuracy: 0.9753 - val\_loss: 0.4808 - val\_accuracy: 0.8333

Epoch 7/40

14/14 [==============================] - 5s 368ms/step - loss: 0.0718 - accuracy: 0.9753 - val\_loss: 0.4554 - val\_accuracy: 0.7778

Epoch 8/40

14/14 [==============================] - 5s 346ms/step - loss: 0.0532 - accuracy: 0.9877 - val\_loss: 0.5216 - val\_accuracy: 0.7778

Epoch 9/40

14/14 [==============================] - 5s 348ms/step - loss: 0.0331 - accuracy: 0.9877 - val\_loss: 0.6610 - val\_accuracy: 0.7222

Epoch 10/40

14/14 [==============================] - 5s 350ms/step - loss: 0.0334 - accuracy: 0.9877 - val\_loss: 0.5805 - val\_accuracy: 0.8333

Epoch 11/40

14/14 [==============================] - 5s 351ms/step - loss: 0.0348 - accuracy: 0.9877 - val\_loss: 0.6943 - val\_accuracy: 0.6667

Epoch 12/40

14/14 [==============================] - ETA: 0s - loss: 0.0370 - accuracy: 0.9815

Epoch 00012: Reducing Max LR on Plateau: new max lr will be 1e-05 (if not early\_stopping).

14/14 [==============================] - 5s 353ms/step - loss: 0.0370 - accuracy: 0.9815 - val\_loss: 0.5992 - val\_accuracy: 0.8333

Epoch 13/40

14/14 [==============================] - 5s 355ms/step - loss: 0.0238 - accuracy: 0.9877 - val\_loss: 0.7815 - val\_accuracy: 0.6667

Epoch 14/40

14/14 [==============================] - 5s 355ms/step - loss: 0.0208 - accuracy: 0.9877 - val\_loss: 0.7795 - val\_accuracy: 0.6667

Epoch 15/40

14/14 [==============================] - 5s 352ms/step - loss: 0.0192 - accuracy: 0.9938 - val\_loss: 0.6597 - val\_accuracy: 0.7778

Epoch 16/40

14/14 [==============================] - 5s 353ms/step - loss: 0.0188 - accuracy: 0.9877 - val\_loss: 0.7253 - val\_accuracy: 0.6667

Epoch 17/40

14/14 [==============================] - ETA: 0s - loss: 0.0283 - accuracy: 0.9877

Epoch 00017: Reducing Max LR on Plateau: new max lr will be 5e-06 (if not early\_stopping).

Restoring model weights from the end of the best epoch: 7.

14/14 [==============================] - 5s 364ms/step - loss: 0.0283 - accuracy: 0.9877 - val\_loss: 0.7131 - val\_accuracy: 0.7222

Epoch 17: early stopping

Weights from best epoch have been loaded into model.

<keras.callbacks.History at 0x7f90763e77d0>

Table

Description automatically generated

# Innovation

begin training using triangular learning rate policy with max lr of 2e-05...

Epoch 1/40

14/14 [==============================] - 33s 714ms/step - loss: 0.7310 - accuracy: 0.5123 - val\_loss: 0.6265 - val\_accuracy: 0.6842

Epoch 2/40

14/14 [==============================] - 5s 365ms/step - loss: 0.6027 - accuracy: 0.7346 - val\_loss: 0.5459 - val\_accuracy: 0.8421

Epoch 3/40

14/14 [==============================] - 5s 368ms/step - loss: 0.4491 - accuracy: 0.8519 - val\_loss: 0.4100 - val\_accuracy: 0.8947

Epoch 4/40

14/14 [==============================] - 5s 348ms/step - loss: 0.3071 - accuracy: 0.9074 - val\_loss: 0.4800 - val\_accuracy: 0.8421

Epoch 5/40

14/14 [==============================] - 5s 350ms/step - loss: 0.2282 - accuracy: 0.9198 - val\_loss: 0.5610 - val\_accuracy: 0.7895

Epoch 6/40

14/14 [==============================] - 5s 353ms/step - loss: 0.1880 - accuracy: 0.9383 - val\_loss: 0.6631 - val\_accuracy: 0.6842

Epoch 7/40

14/14 [==============================] - 5s 355ms/step - loss: 0.1453 - accuracy: 0.9630 - val\_loss: 0.4222 - val\_accuracy: 0.8421

Epoch 8/40

14/14 [==============================] - ETA: 0s - loss: 0.1023 - accuracy: 0.9753

Epoch 00008: Reducing Max LR on Plateau: new max lr will be 1e-05 (if not early\_stopping).

14/14 [==============================] - 5s 356ms/step - loss: 0.1023 - accuracy: 0.9753 - val\_loss: 0.4785 - val\_accuracy: 0.7895

Epoch 9/40

14/14 [==============================] - 5s 381ms/step - loss: 0.0907 - accuracy: 0.9815 - val\_loss: 0.4099 - val\_accuracy: 0.8421

Epoch 10/40

14/14 [==============================] - 5s 384ms/step - loss: 0.0858 - accuracy: 0.9815 - val\_loss: 0.3986 - val\_accuracy: 0.8947

Epoch 11/40

14/14 [==============================] - 5s 389ms/step - loss: 0.0862 - accuracy: 0.9753 - val\_loss: 0.3887 - val\_accuracy: 0.8947

Epoch 12/40

14/14 [==============================] - 5s 389ms/step - loss: 0.0687 - accuracy: 0.9877 - val\_loss: 0.3841 - val\_accuracy: 0.8947

Epoch 13/40

14/14 [==============================] - 5s 368ms/step - loss: 0.0755 - accuracy: 0.9753 - val\_loss: 0.3852 - val\_accuracy: 0.8947

Epoch 14/40

14/14 [==============================] - 5s 370ms/step - loss: 0.0667 - accuracy: 0.9815 - val\_loss: 0.3878 - val\_accuracy: 0.8947

Epoch 15/40

14/14 [==============================] - 5s 371ms/step - loss: 0.0764 - accuracy: 0.9815 - val\_loss: 0.3866 - val\_accuracy: 0.8947

Epoch 16/40

14/14 [==============================] - 5s 369ms/step - loss: 0.0769 - accuracy: 0.9815 - val\_loss: 0.3980 - val\_accuracy: 0.8947

Epoch 17/40

14/14 [==============================] - ETA: 0s - loss: 0.0695 - accuracy: 0.9815

Epoch 00017: Reducing Max LR on Plateau: new max lr will be 5e-06 (if not early\_stopping).

14/14 [==============================] - 5s 367ms/step - loss: 0.0695 - accuracy: 0.9815 - val\_loss: 0.4153 - val\_accuracy: 0.8947

Epoch 18/40

14/14 [==============================] - 5s 365ms/step - loss: 0.0562 - accuracy: 0.9815 - val\_loss: 0.3898 - val\_accuracy: 0.8947

Epoch 19/40

14/14 [==============================] - 5s 364ms/step - loss: 0.0683 - accuracy: 0.9753 - val\_loss: 0.3937 - val\_accuracy: 0.8947

Epoch 20/40

14/14 [==============================] - 5s 363ms/step - loss: 0.0659 - accuracy: 0.9815 - val\_loss: 0.3963 - val\_accuracy: 0.8947

Epoch 21/40

14/14 [==============================] - 5s 362ms/step - loss: 0.0638 - accuracy: 0.9815 - val\_loss: 0.4721 - val\_accuracy: 0.8421

Epoch 22/40

14/14 [==============================] - ETA: 0s - loss: 0.0545 - accuracy: 0.9877

Epoch 00022: Reducing Max LR on Plateau: new max lr will be 2.5e-06 (if not early\_stopping).

Restoring model weights from the end of the best epoch: 12.

14/14 [==============================] - 5s 374ms/step - loss: 0.0545 - accuracy: 0.9877 - val\_loss: 0.4552 - val\_accuracy: 0.8421

Epoch 22: early stopping

Weights from best epoch have been loaded into model.

<keras.callbacks.History at 0x7fda300d85d0>

Table

Description automatically generated